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Serial No. 08/931,187

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS AND INTERFERENCES**

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Technology Center 2100

Appellants: Jerrie L. COFFMAN et al.

Application No.: 09/215,788

Filing Date: December 21, 1998

Title: EFFICIENTLY EXPORTING LOCAL DEVICE ACCESS ONTO A
SYSTEM AREA NETWORK USING A DIRECT-CALL INTERFACE

Art Unit: 2152

Examiner: B. Prieto

REPLY BRIEF UNDER 37 C.F.R. §1.193(b)

Assistant Commissioner of Patents
Washington, D.C. 20231
Box: AF

April 14, 2003

Sir:

In response to the *Examiner's Answer* dated on February 12, 2003 (Paper No. 21), Appellants hereby submit this reply directed to those new points of arguments raised in the *Examiner's Answer*.

This *Reply Brief* is being filed in triplicate.

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I. Statement of Real Party in Interest

Pursuant to 37 C.F.R. §1.92(c)(1)(as amended), the real party in interest is:

Intel Corporation
2200 Mission College Blvd., SC4-202
Santa Clara, CA 95052

II. Related Appeals and Interferences

Pursuant to 37 C.F.R. §1.192(c)(2)(as amended), although the real party in interest has other pending appeals and interferences, none of the other pending appeals and interferences is believed to directly affect or be directly affected by, or to have any bearing upon the decision of the Board of Patent Appeals and Interferences in this appeal.

III. Status of the Claims

The Examiner has indicated that Appellant's status of claims 1-21 and 23-28 contained in the *Appeal Brief* is correct and, therefore, need not be repeated herein.

IV. Status of the Amendments

The Examiner has indicated that Appellant's status of the Amendments after the final rejection as contained in the *Appeal Brief* is correct and, therefore, need not be repeated herein.

V. Summary of the Invention

The Examiner has indicated that Appellant's Summary of the Invention contained in the *Appeal Brief* is correct and, therefore, need not be repeated herein.

VI. Issues

1. Whether claims 1-18 are unpatentable under 35 U.S.C. §103(a) as rendered obvious over Heil et al., U.S. Patent No. 6,173,374, as modified to incorporate selected features from the Intelligent I/O (I₂O) Architecture Specification, Version 1.5, March 1997.
2. Whether claims 19-21 and 23-28 are unpatentable under 35 U.S.C. §103(a) as rendered obvious over Heil et al., U.S. Patent No. 6,173,374, as modified to incorporate selected features from the Intelligent I/O (I₂O) Architecture Specification, Version 1.5, March 1997, and Bonola, U.S. Patent No. 6,321,279.

VII. Grouping of Claims

Claims 1-21 and 23-28, as pending on Appeal, stand or fall independently of each other under 37 C.F.R. §1.192(c)(5) for the reasons set forth in the arguments discussed in the *Appeal Brief*. However, the Examiner has argued that claims 24-28 stand and fall together (i.e., they are not separately patentable) for reasons outlined

on item #13, page 18 of the *Examiner's Answer* (Paper No. 21). Specifically, the Examiner alleges that Appellants' arguments with respect to claims 24-28 simply "amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes [sic] them from the references." This allegation is simply incorrect. On pages 46-47 of the *Appeal Brief* filed on December 6, 2002, Appellants have specifically pointed out how the language of each of dependent claims 24-28 patentably distinguishes over the Examiner's proposed combination of Heil et al., U.S. Patent No. 6,173,374; the Intelligent I/O (I₂O) Architecture Specification, Version 1.5, March 1997; and Bonola, U.S. Patent No. 6,321,279. As a result, claims 24-28 also stand or fall independently of each other under 37 C.F.R. §1.192(c)(5).

VIII. Claims Appealed

The Examiner has stated that the copy of the appealed claims contained in the Appendix of the *Appeal Brief* is correct and, therefore, need not be repeated herein.

IX. Arguments

- 1. Claims 1-18 are deemed patentable over the proposed combination of Heil et al., U.S. Patent No. 6,173,374 and the Intelligent I/O (I₂O) Architecture Specification, V. 1.5, March 1997.**

Claims 1-18 stand rejected under 35 U.S.C. §103(e) as being unpatentable over the Examiner's proposed combination of Heil et al., U.S. Patent No. 6,173,374 (hereinafter referred as Heil '374) and the Intelligent I/O (I₂O) Architecture Specification, Version 1.5, March 1997. The new points of argument found in the *Examiner's Answer* (Paper No. 21) are addressed herein below.

Specifically, the Examiner on page 10 and throughout pages 11-18 of the *Examiner's Answer*, seems to acknowledge Appellants' explanations as to:

- (1) the distinction between Appellants' disclosed "driver system" or "driver module" which is a software driver used to enable a computer to work with a particular hardware peripheral device (i.e., printer, disk driver, network interface card "NIC" or host bus adapter "HBA"), and the "host bus adapter (HBA)" disclosed by Heil '374 which is simply a hardware peripheral device; and
- (2) the two split modules, including a host driver module 310 and a device driver module 322 shown in FIG. 3, that constitute Appellants' disclosed "driver system".

Nevertheless, the Examiner asserts that Appellants' explanations are without merits because independent claims 1, 7 and 14 do **not** recite, or expressly identify "a host driver module" as "an upper module which is a host OS-specific portion of the driver system that interfaces with a host operating system" and "a device driver module" as "a lower module which is a device-specific portion of the driver system that interfaces with I/O devices."

However, there is **no** need for Appellants to expressly recite or identify the inherent functionality of the “driver system” or “driver module” as defined in each of Appellants’ independent claims 1, 7 and 14 as alleged by the Examiner. This is because the term “driver” is a well-known “term of art” that has a specific meaning to one skilled in the computer art. For example, the term “driver” is defined by the Computer Glossary, The Complete Illustrated Dictionary, 9th Edition, as “a program routine that links a peripheral device to the operating system (OS)”. Likewise, in the Microsoft Computer Dictionary, 4th Edition, “software driver” is defined as:

“a device-specific control program that enables [a computer system] to work with a particular device, such as a printer or a disk drive. Because the driver handles device-specific features, the operating system is freed from the burden of having to understand – and support – the needs of individual hardware devices.”

In other words, the term “driver module” as expressly defined in Appellants’ independent claims 7 and 14, or alternatively known as “input/output platform (IOP) access module”¹ as expressly defined in Appellants’ independent claim 1 is a well-known “term of art” that refers to a **software program** written to enable a computer system to work or communicate with a particular peripheral device such as a printer, a disk drive, a network interface card (NIC) or a host bus adapter (HBA).

¹ The host “driver module” is also known as an input output platform (IOP) access module, as expressly acknowledged on page 8 of Appellants’ original specification.

Likewise, there is **no** need for Appellants to expressly recite or identify the inherent functionality of each of the two split modules (i.e., a host driver module 310 and a device driver module 322 shown in FIG. 3) of the “driver system” or “driver module” in each of Appellants’ independent claims 1, 7 and 14 as alleged by the Examiner. This is because Appellants’ disclosed invention is directed to a novel driver system designed in accordance with the Intelligent I/O (I₂O) Architecture Specification,² Version 1.5, March 1997. More specifically, Appellants’ claimed “driver system” is designed pursuant to the split driver model shown in Figure 2-2 (I₂O Split Driver Model) of the Intelligent I/O (I₂O) Architecture Specification, including “a host driver module” which is “an upper module – a host OS-specific portion of the driver system that interfaces with a host operating system” and “a device driver module” which is “a lower module – a device-specific portion of the driver system that interfaces with I/O devices.”³ Again, the term “host driver module”

² The Intelligent I/O (I₂O) Architecture Specification describes an open architecture for developing device drivers in network system environments. The objectives of the specification are: (1) to define an environment that coexists with existing device drivers; (2) to provide an architecture that isolates the intelligent I/O subsystem from the host operating system; (3) to create an architecture that allows device drivers to scale across system platforms; and (4) to enable device drivers from port across target processors. In other words, the Intelligent I/O (I₂O) Architecture Specification provides a standard for which numerous vendors, including Intel Corp.TM to develop device drivers and I/O adapters more cost-effectively across a variety of platforms and system interconnections.

³ Page 10 of Appellants’ original specification expressly acknowledges that “[T]ypically, the host driver module 310 is a host OS-specific portion of the driver

and the term "device driver module" are both "term of art" that are well-known to one skilled in the art as evidenced from the Intelligent I/O (I₂O) Architecture Specification⁴ and, as a result, need not be expressly recited or identified in each of Appellants' independent claims 1, 7 and 14. However, Appellants are entitled to claim individual modules of the driver system, either alone or in combination, for example, the host driver module individually as presented in Appellants' independent claims 1 and 14, or in combination with the device driver module as presented in Appellants' independent claim 7.

More importantly, Appellants' several explanations provided in the *Appeal Brief* are only meant to illustrate the incorrectness of the Examiner's position as formulated in the final Office Action (Paper No. 12), as well as to demonstrate the impossibility of relying on a host bus adapter (HBA) as disclosed by Heil '374 which is a hardware peripheral device to render Appellants' claimed "driver module" or "IOP access module" as expressly defined in Appellants' independent claims 1, 7

system that interfaces with the host OS, whereas the device driver module 322 is a device-specific portion of the driver system that interfaces with the particular controllers and I/O devices."

⁴ Splitting the driver as shown in Figure 2-2 of the Intelligent I/O (I₂O) Architecture Specification produces two modules:

1. **OS-Specific Module (OSM).** The **upper module** provides the interface to the operating system. Typically, the OS vendor supplies this module, which contains no hardware-specific code.
2. **Hardware Device Module (HDM).** The **lower module** provides the interface to the I/O adapter and its devices. The hardware vendor

and 14, which is a software driver, obvious under 35 U.S.C. §103. Simply, the disclosure of a hardware peripheral device (regardless of the high level of sophistication) does **not** provide suggestion or motivation to one skilled in the art to make any kind of modification to arrive at a software driver.

As previously discussed, Heil '374, as a primary reference, only the use of one or more host bus adapters (HBA), hardware peripheral devices, also known as network interface cards (NIC), that is designed to handle I/O requests received from a host system. According to Heil '374, each intelligent HBA is connected to a peer HBA via a Fibre Channel backbone, and contains therein a directory within memory for storing location information regarding blocks of data stored in I/O storage devices, and software for searching the directory to determine whether to locally or remotely retrieve blocks of data. While software layers are implemented within each host bus adapter (HBA), none of these software layers can be interpreted to read on individual components of Appellants' claimed "driver system" including "a Local Transport arranged to provide an interface to an input/output platform (IOP) supporting an array of input/output devices;" "a Remote Transport arranged to provide an interface to said another system;" and "a Connection Manager arranged to establish connection services and to create a direct call path between the Local Transport and the Remote Transport so as to provide access to IO devices" as

supplies this module, which contains no OS-specific code.

generally defined in Appellants' independent claims 1, 7 and 14.

In order to establish a *prima facie* case of obviousness under 35 U.S.C. §103, not only the claimed invention must be considered as a whole, but three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skilled in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and **not** based on Appellants' disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP 2143. In other words, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." In re Wilson, 424 F.2d 1382, 1385, 165 USQP 494, 496 (CCPA 1970).

In the present situation, the Examiner has not only ignored to treat Appellants' claimed invention as a whole, but deliberately misinterpreted the teachings of Heil '374 and the Intelligent I/O (I₂O) Architecture Specification, failed to consider all the key limitations of Appellants' independent claims 1-18, and failed to provide any

suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skilled in the art, to modify the teachings from the Intelligent I/O (I₂O) Architecture Specification into Heil '374 in order to arrive at Applicants' claims 1-18.

2. **Claims 19-21 and 23-28 are deemed patentable over the proposed combination of Heil et al., U.S. Patent No. 6,173,374, the Intelligent I/O (I₂O) Architecture Specification, Version 1.5, March 1997, and Bonola, U.S. Patent No. 6,321,279.**

Claims 19-21 and 23-28 stand finally been rejected under 35 U.S.C. §103(e) as being unpatentable over the Examiner's proposed combination of Heil et al., U.S. Patent No. 6,173,374 (hereinafter referred as Heil '374), the Intelligent I/O (I₂O) Architecture Specification, Version 1.5, March 1997, and Bonola, U.S. Patent No. 6,321,279. The new points of argument found in the *Examiner's Answer* (Paper No. 21) are addressed herein below.

Specifically, the Examiner on page 16 of the *Examiner's Answer*, cites Section 2.1.4.1, Page 2-11; Section 2.1.7.2, Page 2-25; Section 2.2.4.1, Page 2-32; and Section 2.2.4.3, Page 2-32 of the Intelligent I/O (I₂O) Architecture Specification to read on specific steps of Appellants' claimed "host driver module" having "a Local Transport", "a Remote Transport" and "a Connection Manager", including:

"wherein, upon initialization, said Local Transport scans the local bus

so as to locate and initialize all local input/output platforms (IOPs) and builds an opaque "context" structure for each input/output platform (IOP), wherein said Remote Transport prepares to accept requests from a remote server through said computer network, and wherein said Connection Manager queries said Local Transport so as to determine the number of input/output platforms (IOPs), builds an IOP descriptor structure for each input/output platform (IOP) which includes an exported table of function call pointers and the context required by the Local Transport to communicate with the input/output platform (IOP), and finally establishes a network management communication channel through the Remote Transport, which waits for an external connection from said remote server on said computer network for exporting local device access onto said computer network using said direct call path between the Local Transport and the Remote Transport."

However, nowhere in the cited portion of the Intelligent I/O (I₂O) Architecture Specification, Version 1.5, March 1997, is there disclosure of any host driver module including modules denoted as "Local Transport", "Remote Transport" and "Connection Manager" designated to perform the functions as identified by the Examiner. Rather, Section 2 of the Intelligent I/O (I₂O) Architecture Specification, Version 1.5, March 1997 simply provides a general system overview, including, for example, a suggested Hardware Architecture (Section 2.1.1); a suggested Split Driver Model (Section 2.1.2), a suggested Message Layer Architecture (Section 2.1.3), a suggested Initialization of the I₂O System (Section 2.1.4.1), a suggested IOP Configuration (Section 2.1.7.2), a suggested Module Structure (Section 2.2.4.1) and a suggested Messenger Service (Section 2.2.4.3).

Again, as previously discussed, the Examiner has already conceded

patentability of Appellants' claim 19. Specifically, on the Examiner Interview Summary attached to the final Office Action (Paper No. 12) dated on June 19, 2002, the Examiner has expressly indicated if the limitation of claim 19 is incorporated into each of Appellants' independent claims 1, 7, 14 and 23, all claims 1-21 and 23-28 as pending on this Appeal will be allowed and the instant application will be in condition for issuance.⁵ In view of the Examiner's express admission that claim 19 is allowable over the proposed combination of Heil '374, the Intelligent I/O (I₂O) Architecture Specification, Version 1.5, March 1997, and Bonola '279, Appellants respectfully request that the rejection of claim 19 and its dependent claims 20-21 be reversed.

Likewise, independent claim 23 defines a process of establishing a service connection to a local IOP connected to a local bus using a system driver module in response to a request from a remote server on a system area network (SAN). Such a driver module may be initialized and activated as follows:

beginning initialization of said driver module which provides access to a local storage system while bypassing protocol stacks of a host operating

⁵ Also see Advisory Action (Paper No. 14) dated on July 12, 2002 and Advisory Action (Paper No. 15) dated on July 31, 2002.

system, said system driver module comprising a Local Transport which provides direct access to the local storage device system, a Remote Transport which interfaces to other nodes of said system area network, and a Connection Manager which provides connection services and coordinates functions responsible for creating a direct call path between the Local Transport and the Remote Transport;

scanning, at said Local Transport, the local bus to locate and initialize all local input/output platforms (IOPs), and building an IOP context structure for each input/output platform (IOP) found;

preparing, at said Remote Transport, to accept a request for a service connection from said remote server on said system area network;

asking, at said Connection Manager, whether said Local Transport determines the number of input/output platforms (IOPs), and building a descriptor structure for each input/output platform (IOP) which includes an exported table of function call pointers and the context required by the Local Transport to communicate with the input/output platform (IOP); and

establishing a system area network management communication channel through the Remote Transport, which waits for an external connection from said remote server on said system area network for exporting local device access onto said system area network using said direct call path between the Local Transport and the Remote Transport.

Again, Appellants' independent claim 23 contains all the limitations that are similar to that of dependent claim 19, and for reasons discussed in view of the Examiner's express admission that claim 19 is allowable over the proposed combination of Heil '374, the Intelligent I/O (I₂O) Architecture Specification, Version 1.5, March 1997, and Bonola '279, Appellants respectfully request that the rejection of independent claim 23 and its dependent claims 24-28 be likewise reversed.

On page 18 of the Examiner's Answer (Paper No. 21), the Examiner also argues that claims 24-28 stand and fall together (i.e., they are not separately patentable) because Appellants' arguments with respect to claims 24-28, according to the Examiner, simply "amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes [sic] them from the references." This allegation is simply baseless. On pages 46-47 of the *Appeal Brief* filed on December 6, 2002, each of dependent claims 24-28 has been demonstrated as being patentably distinguishable over the Examiner's proposed combination of Heil et al., U.S. Patent No. 6,173,374; the Intelligent I/O (I₂O) Architecture Specification, Version 1.5, March 1997; and Bonola, U.S. Patent No. 6,321,279.

For example, dependent claim 24 further defines that the IOP comprises: "a device driver module which interfaces the local storage devices, and which controls an array of local storage devices; and a communication layer which defines a mechanism for communications between the system [host] driver module and the device driver module". These feature are **not** disclosed anywhere in Heil '374, the Intelligent I/O (I₂O) Architecture Specification, or Bonola '279.

Dependent claim 25 further defines that the "communication layer is responsible for managing all service requests and providing a set of Application Programming Interfaces (APIs) for delivering messages, along with a set of support

routines that process the messages, and is comprised of a message layer which sets up a communication session, and a transport layer which defines how information will be shared". Again, none of these features is disclosed or suggested by Heil '374, the Intelligent I/O (I₂O) Architecture Specification, or Bonola '279.

Dependent claim 26 further defines that "the host driver module and the device driver module constitute a single device that is portable across a plurality of operating systems and host network platforms, and works interoperably with a plurality of storage devices and operating systems". Again, this feature is **not** disclosed anywhere in Heil '374, the Intelligent I/O (I₂O) Architecture Specification, or Bonola '279.

Dependent claim 27 further defines that the "Local Transport further has a send handler function and [the] Remote Transport further as a receiver handler function which are respective program interfaces for receiving an inbound message from a remote server on said system area network for direct access to local IOP and for delivering an outbound message to said remote server on said system area network". Again, these feature are **not** disclosed anywhere in Heil '374, the Intelligent I/O (I₂O) Architecture Specification, or Bonola '279.

Lastly dependent claim 28 further defines that the "Remote Transport further builds an IOP connection structure including at least an IOP descriptor pointer which refers to the IOP descriptor structure of the Connection Manager for making a direct

call to the Local Transport through the receiver handler function and the send handler function". Again, these feature are **not** disclosed anywhere in Heil '374, the Intelligent I/O (I₂O) Architecture Specification, or Bonola '279.

In view of the foregoing explanations, and in view of the fact that neither Heil '374, the Intelligent I/O (I₂O) Architecture Specification, nor Bonola '279, whether taken in combination or individually, discloses and suggests Appellants' dependent claims 24-28. Therefore Appellants respectfully request that the rejection of dependent claims 24-28 be reversed as well.

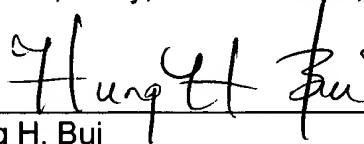
X. Conclusion

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In view of the law, the facts and the explanations presented herein, Appellants respectfully submit that the Examiner's proposed combination of Heil '374, the Intelligent I/O (I₂O) Architecture Specification, and Bonola '279, fails to disclose or suggest Appellants' claimed invention and, as a result, request that the outstanding rejections of Appellants' claims 1-21 and 23-28 as pending on Appeal be reversed.

No fee is incurred by this Reply Brief. However, please charge any shortage of fees due in connection with the filing of this paper, if necessary, to the Deposit Account of Antonelli, Terry, Stout & Kraus, No. 01-2135 (Application No. 219.36435X00), and please credit any excess fees to said deposit account.

Respectfully submitted,
Antonelli, Terry, Stout & Kraus, L.L.P.

A handwritten signature in black ink, appearing to read "Hung H. Bui", written over a horizontal line.

Hung H. Bui
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